

Bell Work: Pre AP
22-Aug-2016

Why is it important to be able to email a document to somebody, give two reasons that are not school focused?

If a student completes everything their teacher asks of them, homework, extra studying, participation in class, etc., should they be guaranteed a grade of A or B? Why?

Agenda

Metric System questions

Dimensional analysis recap

Syllabus

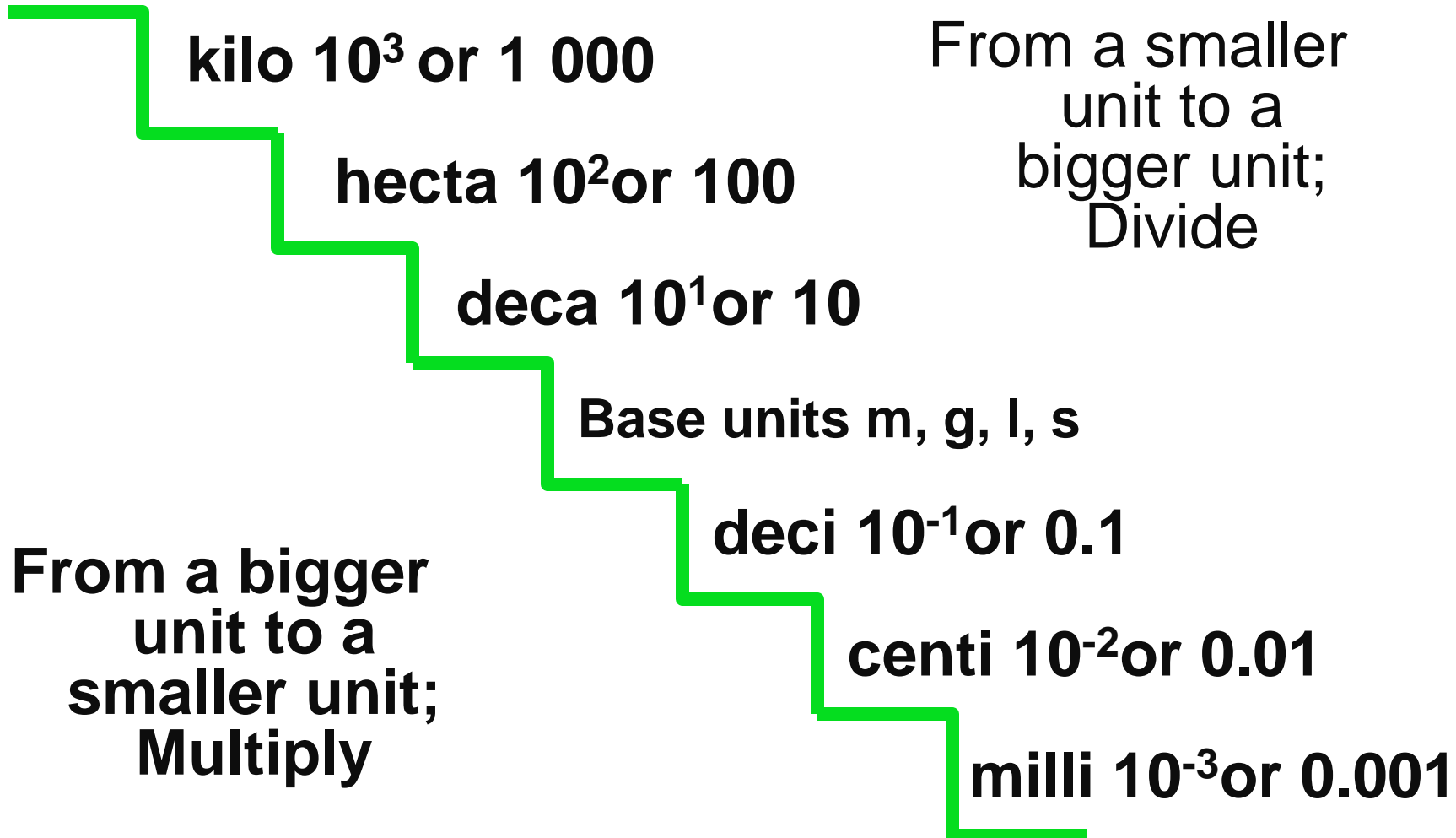
Objectives

Use dimensional analysis to convert units
in the metric system


THE METRIC SYSTEM

<u>Metric (SI)</u>	<u>Unit</u>	<u>Standard System</u>
Meter (m) (mm,cm,km)	<u>Length</u>	Yard (inch, foot, mile)
Gram (g) (mg, µg, kg)	<u>Mass</u>	Pound (ounce, ton)
Celsius (°C)	<u>Temperature</u>	Fahrenheit (°F)
Liter (L) (mL, µL, kL)	<u>Volume</u>	Quart (tspn, tbl, cup, pint, gallon)
Second (s)	<u>Time</u>	Second (s)
Speed (m/s)	<u>Derived Units</u> <u>(Combination of Base Units)</u>	Speed (ft/s)

The Metric System



The Metric System

kilo-	k	1 000 (thousand)	10^3
hecto-	h	100 (hundred)	10^2
deca-	da	10 (ten)	10^1
	<u>m, L, s, g</u>	One (Base Unit)	10^0
deci-	d	0.1 (tenth)	10^{-1}
centi-	c	0.01 (hundredth)	10^{-2}
milli-	m	0.001 (thousandth)	10^{-3}

Converting in the Metric System: Dimensional Analysis

Moving the decimal place is helpful and fast,
but not as useful as using dimensional
analysis and conversion factors.

Ex. How many mm in 1m?

First – Determine what the conversion factors
are, how are the two units related.

$$1000mm:1m \qquad \frac{1000mm}{1m} \qquad \frac{1m}{1000mm}$$

Converting in the Metric System: Dimensional Analysis

Ex. How many mm in 1m?

Second- Which conversion factor will let you cancel out the unit you have and end with the unit you want, when multiplying?

We want mm and need to cancel out m:

$$1\text{m} \times \underline{\quad ? \quad}$$

$$1000\text{mm} : 1\text{m}$$

$$\frac{1000\text{mm}}{1\text{m}}$$

$$\frac{1\text{m}}{1000\text{mm}}$$

Converting in the Metric System: Dimensional Analysis

Ex. How many mm in 1m?

Third – Set up the conversion and carry it out.

$$\cancel{1m} \times \frac{1000mm}{\cancel{1m}} = 1\ 000mm$$

Converting in the Metric System: Dimensional Analysis

You try: How many ml are in 3dl?

First - What is the relation ship between ml and dl,
and the possible conversion factors?

Second – which conversion factor will get give us
our desired unit?

Third – Cary out the conversion

$$3\cancel{dl} \times \frac{100ml}{1\cancel{dl}} = 300ml$$

Practice

How many mm are there in 2.1km?

Need to go from km to mm

km → base(meter) → deci → centi → milli

$$\begin{array}{r} 2.1\cancel{\text{km}} \times \underline{1\,000\,000\text{mm}} = \\ \phantom{2.1\cancel{\text{km}} \times } \cancel{\text{km}} \\ 2\,100\,000\text{ mm} \end{array}$$

Converting Metric Units

Making more from a larger number

Multiply by base 10 (number of spaces)

Ex. Convert 2.3 kg to g

$$2.3 \text{ kg} \times \text{______} \text{g} =$$

Ex. Convert 5.7 g to mg.

$$5.7 \text{ g} \times \text{______} \text{mg} =$$

The Metric System

Converting Metric Units

Making less from a number

Divide by base 10 (number of spaces)

Ex. Convert 1.5 g to kg.

$$1.5 \text{ g} \times \text{______} \text{ kg} =$$

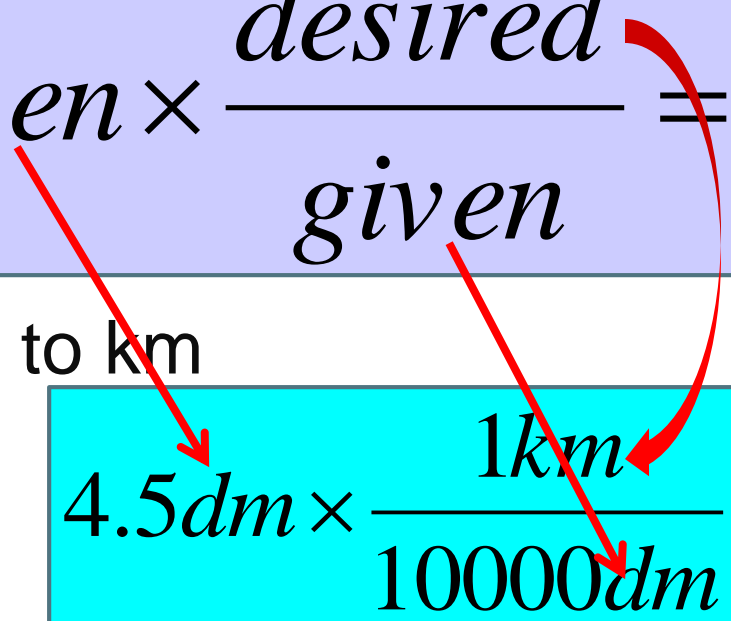
Ex. Convert 8.2 mg to \text{______} g.

$$8.2 \text{ mg} \times \text{______} \text{ g} =$$

Dimensional Analysis

Start with
the value
and unit
you have

Choose a conversion factor
that allows you to cancel
out the starting (given) unit

$$\textit{given} \times \frac{\textit{desired}}{\textit{given}} =$$


Example: 4.5dm to km

$$4.5dm \times \frac{1km}{10000dm} =$$

Using Dimensional Analysis

If you have a 71in tall person,
how tall are they in cm?

**First: Find an equivalence
between in and cm, then write
the two conversion factors**

$$\frac{1\text{in}}{2.54\text{cm}}$$

or

$$\frac{2.54\text{cm}}{1\text{in}}$$

**Second: Pick the conversion factor that
lets you cancel out the given unit**

**Third: Carry out the
conversion**

$$71\text{in} \times \frac{2.54\text{cm}}{1\text{in}} =$$

LENGTH : Imperial to Metric

1 inch(in)	2.54cm	25.4mm
6 inches	15.24cm	152.4mm
1 Foot	30.48cm	304.8mm
1 Yard	91.44cm	914.4mm
1 Foot	30.48cm	0.3048m
6 Feet	182.88cm	1.828m
12 Feet	365.76cm	3.657m
30 Feet	914.40cm	9.144m
50 Feet	1524.00cm	15.240m

The Kilo Gram

<http://youtu.be/ZMByl4s-D-Y>

The Metric System

Practice problems – Convert using dimensional analysis.

550 millimeters to meters

3.5 moles to millimoles

1.6 kilograms to grams

2500 milligrams to kilograms

4.0 centimeters to millimeters

5 liters to milliliters

Before you Leave

What are four (4) metric prefixes you need to commit to memory?

Write out the step for using dimensional analysis on a scratch piece of paper.

Bell Work

24-Aug-2017

1. What is the area of the circle in the picture below in m^2 ? ($A_{\text{circle}} = \pi r^2$, $1\text{ft} = 0.305\text{m}$)

2. If the area of the parking lot is $16\,288\text{m}^2$, what percent of the circle is the parking lot ?



**Diameter is
1 055.8ft**

If a student completes everything their teacher asks of them, homework, extra studying, participation in class, etc, should they be guaranteed a grade of A or B?

Why?

Agenda

Scale of numbers

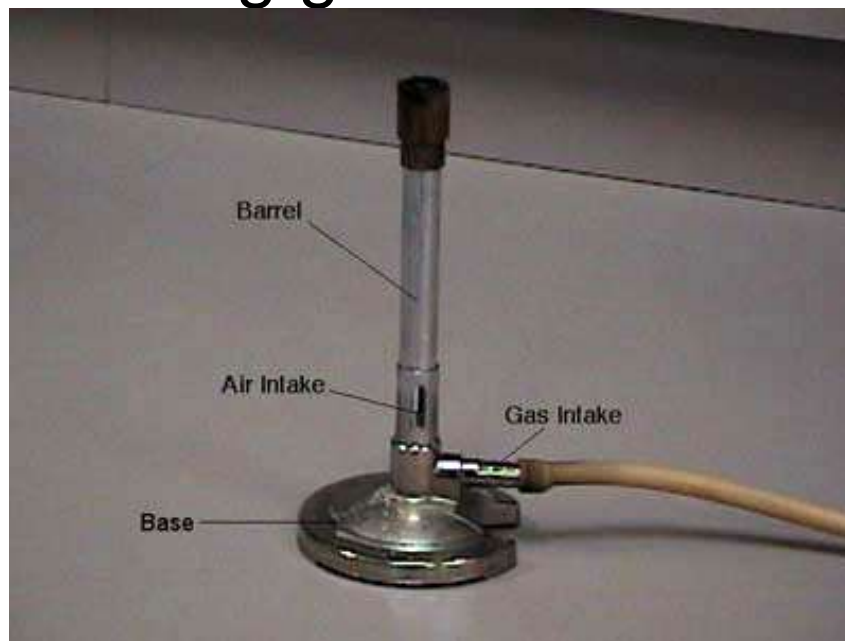
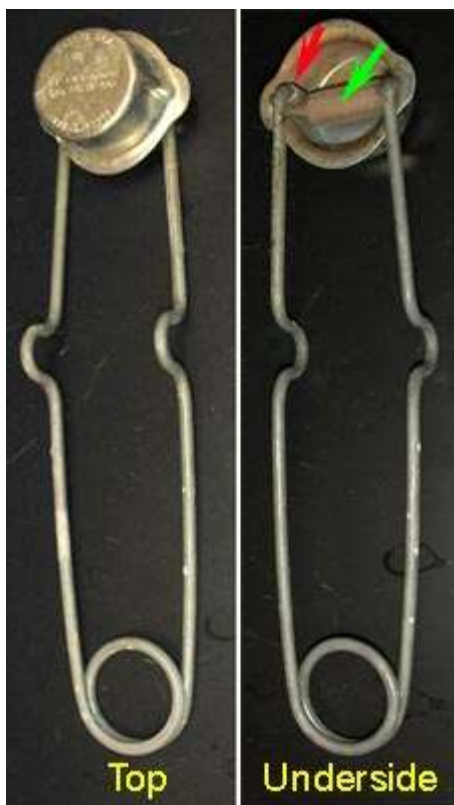
Objectives

Use dimensional analysis to calculate various times/ quantity and begin to develop an understanding of the magnitude of numbers.

Bunsen Burner

You will use a striker to light the burner.

1. Turn gas on
2. place striker 1-3cm above burner
3. Strike striker to light
4. Adjust flame using gas valve and air intake



What is a million (10^6)?

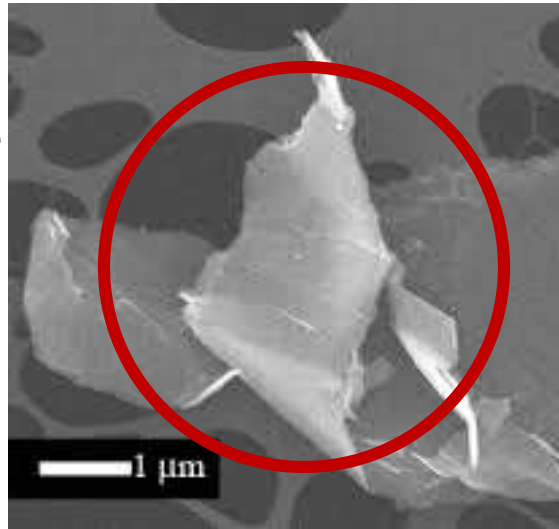
- A. In your groups have three (3) people time one person counting out 20, \$1 dollar bills as fast as they can. Record the times and take the average (s). Repeat this until you have data from three (3) different people counting.
- B. What was the average rate, \$/s, for counting \$20?
- C. How many minutes, hours and days will it take to count out \$1 000, \$10 000, \$100 000, and \$1million one (1) dollar bills at the average rate?

Bell Work

25-Aug-2017

1. What is the area of the circle in the picture below in μm^2 ? ($A_{\text{circle}} = \pi r^2$, $1\mu\text{m}=10^3\text{nm}$)

2. If the area of the graphene flake is $1.71\mu\text{m}^2$, what percent of the circle is the flake?



**Diameter is
 $2.1 \times 10^3 \text{ nm}$**

If a student completes everything their teacher asks of them, homework, extra studying, participation in class, etc, should they be guaranteed a grade of A or B?

Why?

Agenda

Suprise

Objectives

Use dimensional analysis to calculate various times/ quantity and begin to develop an understanding of the magnitude of numbers.

Homework

25-Aug-2017

- Dimensional analysis practice, #11-30

Bell Work

28-Aug-2017

If a car gas tank consumed 4.5mL of fuel every 15seconds, how long will it take a 45L tank to empty?

EQ: How can time management skills practices in class/ lab be useful in helping you get enough sleep at night?

Agenda

Dimensional Analysis Group Practice

Green Sheet Up date

THESE PREFIXES MAY BE APPLIED TO ALL SI UNITS

Multiples and Submultiples	Prefixes	Symbols
1 000 000 000 000 = 10^{12}	tera (těr 'à)	T
1 000 000 000 = 10^9	giga (jì 'gà)	G
1 000 000 = 10^6	mega (mèg 'à)	M*
1 000 = 10^3	kilo (kǐl 'ò)	k*
100 = 10^2	hecto (hěk 'tò)	h
10 = 10^1	deka (dèk 'à)	da
0.1 = 10^{-1}	deci (dēs 'ǐ)	d
0.01 = 10^{-2}	centi (sěn 'tǐ)	c*
0.001 = 10^{-3}	milli (mǐl 'ǐ)	m*
0.000 001 = 10^{-6}	micro (mī 'krō)	μ^*
0.000 000 001 = 10^{-9}	nano (năn 'ò)	n
0.000 000 000 001 = 10^{-12}	pico (pē 'kō)	p
0.000 000 000 000 001 = 10^{-15}	femto (fēm 'tō)	f
0.000 000 000 000 000 001 = 10^{-18}	atto (āt 'tō)	a

Base unit, 10^0 (Liter,
gram, meter, calorie,
etc)

*Most commonly used

The Kilo Gram

<http://youtu.be/ZMByl4s-D-Y>

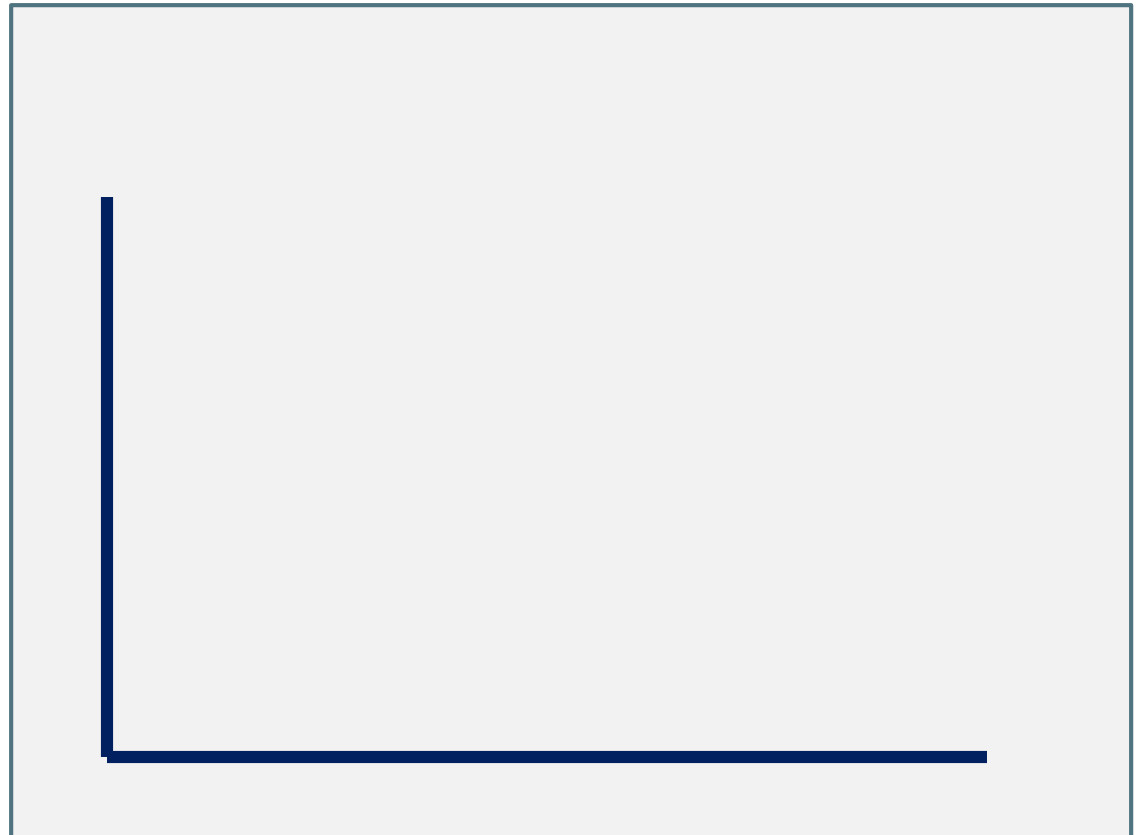
Bell Work

30-Aug-2017

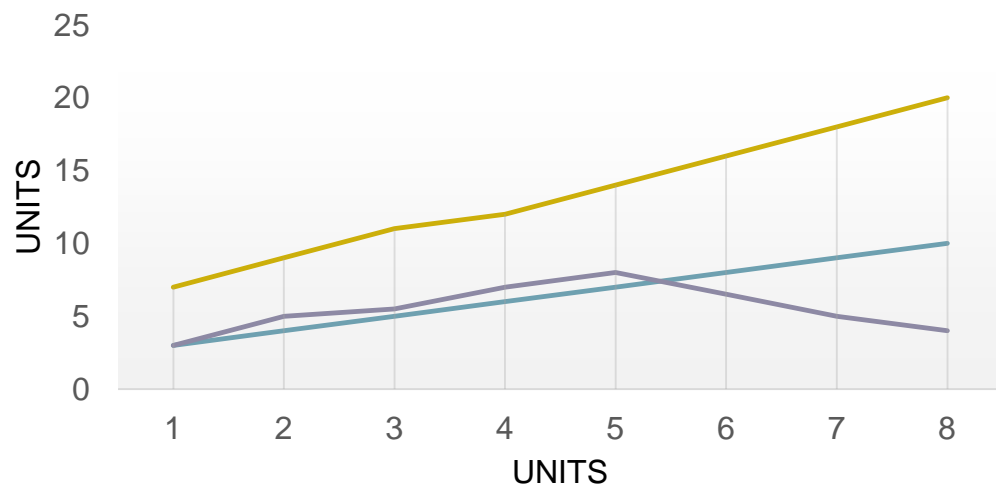
Graph the following data points as a line graph.
Include all components need to make a graph

A vs. Z and Blah

Protons	Mass	SDS
3	7	3
4	9	5
5	11	5.5
6	12	7
7	14	8
8	16	6.5
9	18	5
10	20	4

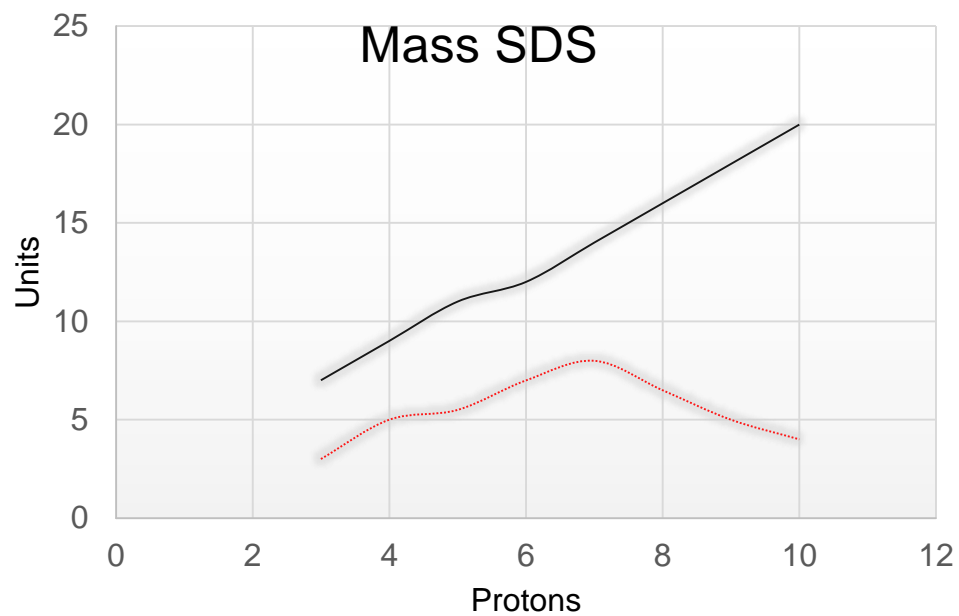


Proton, Mass, SDS



— Protons — Mass — SDS

Mass SDS



EQ: How can time management skills practices in class/ lab be useful in helping you get enough sleep at night?

Agenda

Student Action Project; Persuasive
Writing #1

Turn In 30 Aug 2017

Dimensional Analysis and Metric System
Practice (#1-30)

Syllabus Parent Sign Off

Using information from the article, previous learning, and the lab, write a persuasive statement (4 or more paragraphs) for perspective voters that moving electric needs toward greater reliance on battery power is a viable and realistic option. Use at least 3 specific points from the article supporting the move and include how any hurdles can be over come.

Home Work

Finish Persuasive Writing, Due
5.Sept.2017

Bell Work

31.Aug.2017, Part 1

A. Get a new, blank piece of paper and set it up as follows. Leave room for each item

Once you are finished, get goggles on and go to your lab bench. Fill out purpose/objective, safety, pre lab questions, and start reading over the procedures

Basic laboratory Skills		Name
		Period
		Date
Purpose/ Objective:	_____→	
Safety:	_____→	
Pre lab Calculations:	_____→	
Procedures		Observation
↓		↓

Pre Lab Format

**Use as many piece
of paper as you
need, use the back
side of the paper
for answering post
lab questions and
calculations only**

Analysis and conclusions should be recorded at the end of the pre lab after the lab

Title	
Name	Date
Purpose/ Objective:	
Safety:	
Pre lab Calculations:	
Procedures	Observation

Bell Work

5.Sept.2017,

A. Get out your pre-lab, a copy of the lab from the front, and put on a pair goggles pre lab questions, and start reading over the procedures

Basic laboratory Skills		Name
		Period
		Date
Purpose/ Objective:	_____→	
Safety:	_____→	
Pre lab Calculations:	_____→	
Procedures		Observation
↓		↓

***EQ:* How does putting a smile on
someones face make your day better?**

Agenda:

Basic lab skills

Basic Lab Skills Lab

Complete sections I, II, and IV as written,

Ignore III and V.

All waste may go down drain.

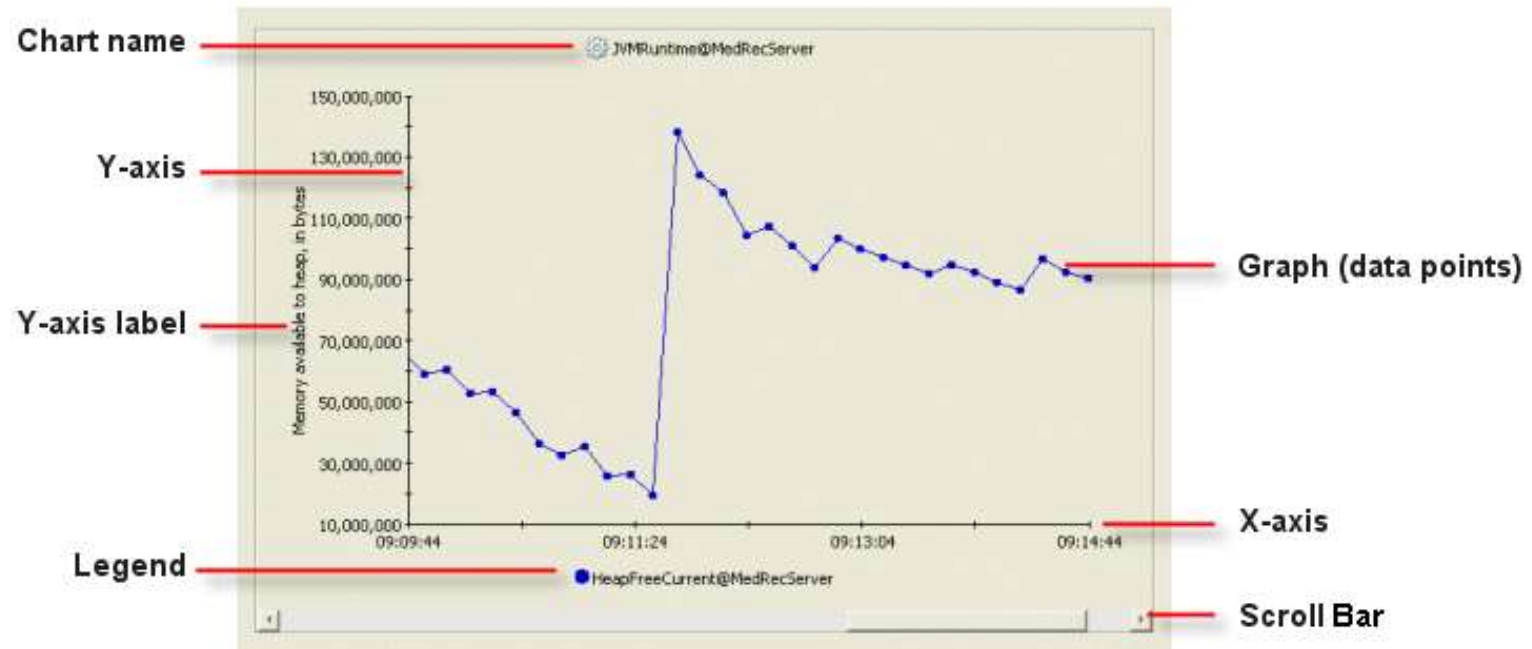
Clean everything when you are finished

Turn In
5.Sept. 17

-Student Action Project; Persuasive Writing
#1, Electrifying

Graphing

Make a data table (4 columns and 4 rows).



The Metric System

- ① Scientific Notation – Scientists use scientific notation to express very large or small numbers. For instance, the span of the universe and the size of viruses are expressed in scientific notation

Sci. Notation

Rules for converting (10 345)

- Move the decimal to make a number between 1 and 10.
- Write ($\times 10$ number of spaces)
 - Move the decimal to the right, + exponent (1.0345×10^4)
 - Move the decimal to the left, - exponent

The Metric System

Scientific Notation – going the other way

- The exponent is the number of places you move the decimal
 - If the decimal is negative (-), move left
 - If the decimal is positive (+), move right

Convert into Scientific Notation

10 000

0.0034

23 000 000

0.000 000 045

4 500 000 000

0.000 000 000 000 056

1.456×10^4

7.0×10^3

9.11×10^6

3.3×10^{-9}

7.89×10^2

$0.000\ 005 \times 10^6$